CHAPTER 5

ENVIRONMENTAL CONSEQUENCES – ALTERNATIVE A

5.1 NATURAL RESOURCES

5.1.1 Geophysical Resources Impacts – Alternative A

The analysis of potential impacts associated with Alternative A on geophysical resources at the Monument Grounds includes discussion of effects on topography, soils, geology, and groundwater. Information on the known existing characteristics of these geophysical resources was compiled. The locations and configurations of the resources were then compared to the location and configuration of the proposed development and modifications. Predictions about short- and long-term impacts to geophysical resources at the Monument Grounds were based upon previous studies and recommendations regarding engineering of the landform and upon engineering analysis of the proposed improvements plan for the Grounds.

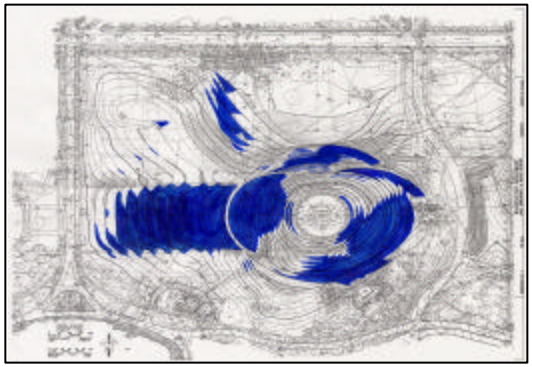
The dispositions of potential impacts identified for geophysical resources at the Washington Monument Grounds were classified in the following categories:

- **No impact** – The proposed development would not affect the geophysical resource.
- **Minor impact** – The proposed development would result in localized and slightly detectable effects, but would not noticeably affect the overall character of the geophysical resource.
- **Moderate impact** – The proposed development would result in clearly detectable effects and would have a noticeable affect on the overall character of the geophysical resource.
- **Major impact** – The proposed development would result in evident effects and would substantially affect the overall character of the geophysical resource.
- **Positive impact** – The proposed development would improve the overall character of the geophysical resource.

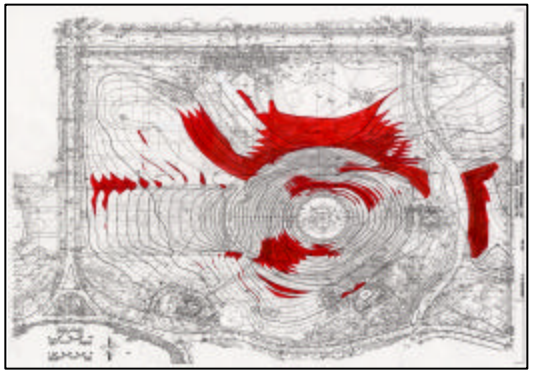
Topography Impacts

Alternative A would slightly reshape the mound that provides the substrate for the Washington Monument. Cut and fill operations would be conducted surrounding the Monument to create terraced intermediate portions of the mound where low retaining walls would be installed to

function as vehicle security barriers. Additional fill would be added on the mound to the west of the Monument to smooth the irregular existing contours and the existing overall asymmetric nature of the mound would be reshaped to a more uniform appearance. However, a stated objective of the Alternative A is to provide security while retaining the general form of the existing mound. Therefore, the general slopes and contours of the landform would not be substantially altered from the existing condition. Changes in elevation from the perimeter of the Grounds to the Monument plaza would not change and average slopes on the Grounds would still be retained between 3 percent and 8 percent grade as in existing conditions. Overall, Alternative A would result in a minor impact to the topography around the Monument.



Alternative A Fill Diagram



Alternative A Cut Diagram

Soils Impacts

Based on evaluation of preliminary designs, the estimated proposed fill would comprise a range from trace amounts to a few feet of material added over approximately 13 acres surrounding the Monument (see Alternative A Fill Diagram). Estimated cuts would include a range from trace amounts to a few feet of material removed from approximately 10 acres surrounding the Monument and near the perimeter of the Grounds (see Alternative A Cut Diagram). The soils that would be disturbed by the development are fill soils that were previously added on the Grounds. Cut and fill amounts would be balanced to the extent possible to minimize the need to import or export soils during construction. Additionally, under Alternative A, the cut and fill of soils on the Grounds would be designed to result in no net change in the soil loads surrounding the Monument. To accomplish this, grading operations would substitute soils created at specific densities (through mixture with natural and synthetic materials) for natural soils on the Grounds to the extent that substrate loading is not substantially modified. Overall, implementation of Alternative A would have a minor impact on existing soil conditions at the Monument Grounds.

During construction, temporary impacts to soils from erosion would be minimized by implementation of erosion and sediment control measures as described regarding surface water. The gentle slopes proposed in Alternative A would not likely increase the potential for erosion on the Grounds.

Geology Impacts

As previously discussed, the foundation of the Washington Monument rests upon an incompressible sand and gravel layer that bears upon a layer of compressible wet clay. The presence of this clay layer has historically been of concern due to the theoretical potential for the Monument to settle (evenly or out of plumb) if the clay layer is compressed. Research on the structural condition of the clay substrate under the Monument indicates that potential compression of the clay could be related to three different factors: (1) loading from the Monument foundation, (2) changes in surrounding soil loading, and (3) dewatering of the clay. However, as demonstrated in the following discussion, Alternative A would have a negligible impact on any of the 3 factors related to compression of the clay.

According to past geotechnical reports prepared for the Monument, the clay substrate of the Monument has been, and will continue to be, subject to relatively slow progressive compression over time due to the load of Monument foundation transmitted to the clay layer. Under Alternative A, the proposed visitor access passageway would be constructed through the below-grade wall of the foundation of the Monument to access the elevator shaft of the Monument. Given conservative calculations based on normal-density concrete, the weight of the removed portion of the foundation could be as much as 495 tons. This would be an approximate 0.6 percent reduction of the current 81,120-ton bearing weight on the Monument foundation subgrade. This reduction in load would be temporary during construction and the combined reduction would not occur at one time. The weight of the access structure constructed within the foundation would be designed to replace or compensate for the reduction in load. Therefore, with the implementation of these design criteria, Alternative A would have a negligible effect on the bearing force of the Monument on the clay substrate.

The clay substrate under the Monument could also potentially be subject to compression if regrading operations substantially increased the effective soil loads surrounding the Monument. However, as explained regarding soils, the proposed regrading of the landscape under Alternative A would integrate soil mixes of varying densities to result in no net change in the soils loads around the Monument. Additionally, the installation of structures and the excavation and installation of the underground access passageway to the Monument would be managed so that the approximate preexisting soil load on the substrate of the Monument would remain

essentially the same at localized areas of construction throughout construction. This would be accomplished by balancing the schedule for removal of soils with the installation of structures to retain the same approximate loading on soils during the construction process. The new below-grade structures and fill added on these structures would also be designed to permanently retain the preexisting soil load at the location of the new facilities. Given that plans for Alternative A do not result in a net change to soil loads surrounding the Monument, the load on the Monument substrate would not likely be significantly modified or unbalanced by the construction or operation of the proposed facilities.

Finally, dewatering of the wet clay substrate beneath the Monument could result in compression of the clay as the layer dries out. The foundations for the visitor screening facility and access passageway extend downward to Elev. +3.5 feet above sea level. This is more than 9 feet above the current elevation of the groundwater table recently documented at about Elev. –5.7. Accordingly, no dewatering would be required during the construction or operation of the Alternative A facilities. Therefore, under the proposed design, Alternative A would not affect the groundwater level below the Monument and would not result in additional compression of the clay substrate due to dewatering and drying.

Based on a detailed evaluation of the potential impacts of Alternative A on the three factors related to potential compression of the clay substrate of the Monument, there would be no substantial changes to settlement of the Washington Monument. Overall, Alternative A would be expected to result in minor impacts to the geologic resources at the Washington Monument Grounds.

Groundwater Impacts

The southwestern portion of the Monument Grounds is located adjacent to the Tidal Basin of the Potomac River. Based on the tidal fluctuation of the groundwater noted in earlier studies, it appears that the site groundwater is connected hydrostatically to the Potomac. Engineers have estimated that this relationship equates to potentially unlimited recharge by the Potomac of the water table at the Grounds (Mueser Rutledge 2002).

As previously discussed, the groundwater level on the Monument Grounds has fluctuated over the existence of the Monument. In 1932, the water table was located at about Mean Sea Level. Due to drawdown of the water table, the groundwater level was located between Elev. –11 and Elev. –10 by 1973. However, due to the proximity of the Potomac River, engineers at that time suggested that the long-term average groundwater level at the Grounds would likely restabilize at an elevation several feet below sea level. Engineers also estimated the water table could temporarily peak near sea level under storm conditions (Hartman-Cox).

The current location of the water table at approximately Elev. –5.7 on the Monument Grounds is in accordance with past engineering predictions. In keeping with those predictions, the rise of the water table to near sea level under storm conditions would still be well below the Elev. 3.5 depth of facilities proposed in Alternative A. Therefore, under both standard and exceptional situations, the constructed features of Alternative A would not be expected to affect groundwater at the Monument Grounds. Additionally, since the water table is well above the clay layer at the Grounds, changes in the water table due to projects or occurrences outside of the scope of the proposed project would not likely dewater the clay layer. Given these conditions, the proposed elements of Alternative A would be essentially unrelated to and unaffected by potential future changes in the water table.

Cumulative Geophysical Impacts

Several proposed projects have been identified in the vicinity of the Washington Monument Grounds that could potentially involve temporary dewatering during construction. These projects include the World War II Memorial, the Red Cross Building, and proposed parking facilities under the Ellipse. At the Monument Grounds, the groundwater recharge capacity of the Potomac River would minimize the likelihood of changes in the water table due to projects not located near the Grounds. Of the three identified proposed projects, the locations of the World War II Memorial and the Ellipse are directly adjacent to the Monument Grounds, while the Red Cross Building is located approximately 0.5 miles from the Grounds.

The proposed method of dewatering for the future Ellipse project is not known. Development of the World War II Memorial, as well as a large percentage of future projects developed in Washington DC, will include the installation of slurry walls socketed into bedrock as the shoring

walls for excavations. Slurry walls seal out groundwater from the project site, therefore permanent dewatering at the site is not required. Additionally, dewatering for construction within slurry walls would not affect groundwater levels outside of the walls. Dewatering for other projects that use pervious shoring walls would allow groundwater levels to drop adjacent to the project site, creating a cone of depression in the water table. Given the use of slurry wall technology, there would be a negligible cumulative impact on groundwater.

Mitigation

- In compliance with the Department of Consumer and Regulatory Affairs (DCRA) permitting regulations, and the *1987 Standards for Soil Erosion and Sediment Control*, erosion and sediment control measures will be implemented to avoid or minimize the potential for sedimentation and contamination impacts to surface waters due to development of the proposed project.
- To reduce the potential for erosion, and to accelerate the reestablishment of vegetation, disturbed or denuded areas will be revegetated upon completion of construction operations.
- To further reduce the potential for sedimentation and contamination impacts to surface waters, proposed impervious surface features such as walking paths will be designed to minimize surface area to the extent practicable.
- Extensive and detailed geotechnical investigations and calculations are being undertaken prior to initiation of construction.
- Cut and fill amounts will be balanced to minimize the need for import or export of soil.
- To minimize the potential for compression in the clay substrate of the Monument, the cut and fill of soil will be designed and implemented to result in no substantial net change in soil loads surrounding the Monument.
- Structural additions to the Grounds will be designed to result in no net change in localized soil loads during construction or operation of the facilities.

5.1.2 Water Resource Impacts – Alternative A

Surface Water Impacts

The removal of vegetation and disturbance of soil during construction of Alternative A could temporarily increase the potential for amplified runoff and erosion on the Monument Grounds. However, during the extent of construction, a DCRA-approved erosion and sediment control plan would be implemented to control erosion and decrease the sediment load of runoff. The plan would comply with criteria and principles as established in the *1987 Standards for Soil Erosion and Sediment Control*. Specific control measures implemented would likely include silt fencing, slope stabilization, and storm drain inlet protection.

The introduction of the Monument Lodge addition, the widening of the pathways, and the removal of the 16th Street parking lot would result in no net change in impervious surface at the Monument Grounds. Approximately 15 percent of the site would continue to be covered by impervious surfaces. Therefore, development of Alternative A would not affect the permanent level of surface runoff from the Grounds.

Alternative A would continue permanent stormwater control essentially as it is currently implemented on the Monument Grounds. A portion of stormwater would infiltrate the proposed vegetated Grounds during overland flow while remaining runoff would enter closed drainage and storm sewer systems. To the west of the Monument, stormwater would be conveyed toward the Tidal Basin, where the water would be filtered and released. North of the Monument, separate storm and sanitary sewer lines would be installed to carry stormwater and wastewater to the combined sewer at Constitution Avenue. South and east of the Monument, separate storm and sanitary sewer lines would be installed to carry stormwater and wastewater to the combined sewer at 15th Street. Under existing conditions the combined sewer lines would convey stormwater to the Blue Plains Wastewater Treatment before release to the Potomac. The existing sewer lines would continue to be susceptible to combined sewer overflow as previously discussed. However, the separate storm and sanitary sewer lines installed in Alternative A would allow effective separation of water flows from the Monument Grounds when the District of Columbia replaces the overflow prone combined system with separate storm and sewer lines.

Wetlands Impacts

Analysis of NWI information has indicated that Alternative A would not disturb land that contains wetlands.

Floodplains Impacts

The proposed modification of completely landscaped areas on the Monument Grounds, some of which are within the 100-year floodplain, would not affect land contributing to the productivity of a floodplain ecosystem. The proposed addition of nominal fill volume within the floodplain adjacent to 17th Street could minimally increase the potential for expansion of floodwaters to the north along 17th Street due to loss of flood storage capacity on the Grounds. However, the Alternative A would support the U.S. Army Corps of Engineer's plan for flood control along 17th Street by providing storage on the Grounds for earth to be used in an emergency levee.

Cumulative Water Resource Impacts

Development of Alternative A would not result in adverse effects to the existing condition of surface waters, wetlands, or floodplains in the vicinity of the Monument. Therefore, the project would not contribute to cumulative impacts to these resources. Further, the installation of separate storm and sanitary sewer lines on the eastern portion of the Monument Grounds during development of Alternative A would allow connection into future separate storm and sanitary sewer lines provided by the District of Columbia, thereby increasing the potential to reduce cumulative impacts due to combined sewer overflow in the future.

Mitigation Measures

The same erosion control measures recommended regarding geophysical resources for Alternative A are recommended regarding water resources for Alternative A. Additionally:

- The existing materials storage for the Corps of Engineer's flood control plan will not be disturbed or removed during construction or operation of the proposed development.

5.1.3 Vegetation Impacts –Alternative A

Development of Alternative A would involve disturbance of fill soils and sod on the hill around the Washington Monument due to the construction of the new visitor screening facility and underground passageway and modification of the path system on the Grounds. Preliminary estimates indicate that the project would temporarily disturb about 5 acres of grassland on the Grounds and less than 0.5 acres of wooded area. No habitat of rare or threatened species would be disturbed by the development. The stands of elm and cherry trees, where specimens have been lost due to poor soil conditions and disease, would be protected during construction. Additionally, the large mulberry tree located on the hill to the southwest of the Monument would also be protected and preserved. Under final development of Alternative A, the grassland areas of the Grounds would be revegetated with sod, and trees would be planted resulting in a net gain in planted woodland on the Grounds.

Cumulative Impacts

The cumulative status of vegetation at the National Mall may continue to decline in the future due to decimation by Dutch elm disease. However, as discussed in the preceding discussion, construction of Alternative A would involve protection against damage to elm trees on the Grounds and would increase the total vegetation in the Monument vicinity.

Mitigation

- During construction, heavy equipment will be strictly confined to areas of proposed development to limit the disturbance of vegetation to the minimum necessary to meet project objectives.
- To reduce the potential for erosion, and to accelerate the reestablishment of vegetation, disturbed or denuded areas will be revegetated upon completion of construction operations.

5.1.4 Wildlife and Aquatic Life Impacts – Alternative A

Alternative A would not disturb rare or threatened animal species or critical faunal habitat. The common wildlife species inhabiting the Washington Monument Grounds could be disturbed or displaced by development of Alternative A. However, these animals should be readily able to utilize ample similar habitat located in proximity to the Monument Grounds.

Cumulative Impacts

The common species that utilize the Washington Monument Grounds and similar habitat at or near the National Mall would not experience a substantial net loss of habitat due to implementation of Alternative A.

Mitigation

- During construction, heavy equipment will be strictly confined to areas of proposed development to limit the disturbance of vegetation to the minimum necessary to meet project objectives.
- Revegetation will be utilized as proposed to remedy the disturbance of vegetation related to development of the proposed project and to enhance existing habitat on the Grounds.

5.1.5 Hazardous Materials Impacts – Alternative A

Disturbed Soils

Under Alternative A, existing soils at the Grounds would be disturbed by grading, landscaping, and cut and fill operations associated with construction of the visitor screening facility, underground passageway and permanent vehicle barrier walls around the Monument and the development of improvements to the landscape and pathways on the Grounds. Given the previous use of fill materials on the Grounds, investigations of soil borings were made to the depth of disturbance in areas affected by the site improvements.

During the proposed development of Alternative A, contaminated soils identified within proposed areas of soil cut would be carefully removed, transported, and deeply buried in locations of proposed fill, in accordance with applicable Federal and District of Columbia regulations for handling contaminated materials. Substantial amounts of clean fill soil would be added over contaminated soils to the extent that the potential for exposure to contaminated material in the finished landscape would be eliminated. Excavated soil requiring removal to an offsite remediation and disposal facility would be coordinated with the D.C. Department of Consumer Affairs (DCRA), the DCRA Environmental Regulation Administration, and the Public Space Maintenance Administration (PSMA). Contaminated soil would be properly treated and disposed of in an approved facility in compliance with Federal and District guidelines. Overall, development of Alternative A would provide the opportunity improve potential adverse soil characteristics at the Grounds created by historic filling operations.

Demolition and Construction

Alternative A proposes to modify the existing Monument Lodge, which has the potential to expose past building materials that may contain hazardous materials such as lead-based paint, asbestos, and other materials that may be now identified as hazardous. Potential impacts would include construction worker safety, public exposure, and disposal of hazardous material waste.

Mitigation

Impacts would be reduced to a level below significance by the implementation of appropriate mitigation measures, such as the use of best management practices for identification, collection, transport, treatment, and disposal of hazardous waste encountered.

5.1.6 Air Quality Impacts – Alternative A

The impact of the proposed project on ambient air quality would be primarily associated with construction activities on the Monument Grounds. No additional visitors to the Monument are anticipated due to this project; therefore, there would be no additional motor vehicles and their emissions, except for construction vehicles, and equipment. Secondary impacts of pollutants on the Grounds would be associated with operation of the project's space heating/cooling equipment and facilities maintenance activities.

The Clean Air Act Amendments of 1990 require Federal agencies to ensure that their actions are consistent with the Clean Air Act and with Federally enforceable air quality management plans (e.g., State Implementation Plans). The implementation of this requirement is known as the General Conformity Rule. The conformity assessment process is intended to ensure that Federal agency actions: (1) will not cause or contribute to new violations of NAAQS; (2) will not increase the frequency or severity of any existing violations of ambient air quality standards; and (3) will not delay the timely attainment of ambient air quality standards, which are the same criteria used to assess a significant air quality impact under NEPA.

EPA has determined specific Federal actions, or portions thereof, to be exempt from the General Conformity Rule. Actions are exempt where the total of all reasonably foreseeable direct and indirect emissions (1) would be less than specified emission rate thresholds, known as de minimis limits, and (2) would be less than 10 percent of the area's annual emission budget. The following assessment relies on specific numerical thresholds for individual air pollutant emissions. These thresholds correspond to the de minimis levels contained in the General Conformity Rule. The Washington metropolitan region is currently designated as a Federal "serious" nonattainment area for ozone. The de minimis thresholds applicable to this classification are emission rates of 50 tons per year each for volatile organic compounds (VOCs) and oxides of nitrogen (NO_x), the pollutants that are the primary constituents in the formation of ozone.

Construction Impacts

Construction may affect air quality as a result of (1) construction equipment emissions, including trucking to and from the Monument Grounds; (2) fugitive dust from demolition, grading, and

earthmoving; and (3) emissions from vehicles driven to and from the site by construction workers. Emissions produced during construction would vary daily depending on the type of activity.

The specific types of equipment that would be used for demolition, grading, utility, paving, and building construction phases are not known, nor has the construction schedule been defined. Once a construction plan is developed, emissions can be estimated using techniques compiled and published by different air quality management districts, and based on the type of land use and the area of facilities to be built. The standard emission factors to be used for estimating are based on the U.S. Environmental Protection Agency Compilation of Air Pollution Emission Factors (commonly referred to as AP-42). The estimated emissions are predicted to be less than the de minimis thresholds and less than 10 percent of the projected area emissions.

Summary of Impacts

Construction emissions are assumed to be less than the de minimis thresholds. Therefore, it may be presumed that the construction emissions resulting from implementing Alternative A conform with the Metropolitan Washington attainment plan and there would be no significant regional air quality impact.

Mitigation

Two assumptions made in calculation of construction emissions will be included in the contractor specifications:

- Electric power for construction will be provided by available commercial power instead of portable generators wherever feasible.
- Water will be used on active grading areas and unpaved roads to eliminate visible dust plumes.

5.1.7 Noise Level Impacts – Alternative A

The effects of Alternative A on ambient noise levels would be primarily associated with construction activities on the Monument Grounds and the operation of construction vehicle access to and on the Grounds. Construction activities for Alternative A would result in intermittent short-term noise effects for the duration of noise-generating construction activities. The noise produced during construction would vary daily depending on the type of construction activity. The basic construction activities may include demolition, excavation and grading, utility construction, and building construction. Demolition for Alternative A would include the removal of paved areas in the plaza and the 16th Street parking lot and specific Grounds pathways and modifications to the Monument Lodge. Noise would be generated during excavation and grading, and utility and building construction. Noise would be generated by construction equipment during all phases of construction, including the movement of heavy trucks to and from the site, and construction worker commute vehicles.

Construction would be required to comply with District noise control regulations: between 7:00 a.m. and 7:00 p.m., noise generated by construction equipment (not including pile drivers) shall not exceed 80 dB(A) at a distance of 25 feet outside the construction site, and between 7:00 p.m. and 7:00 a.m., noise generated by construction equipment shall not exceed 55 dB(A) at a distance of 25 feet outside the construction site.

The specific types of equipment that would be used for demolition, grading, utility, paving, and building construction phases are not known at this time. Construction activities would normally involve the use of bulldozers and jack hammers during demolition; bulldozers, scrapers, backhoes, and trucks during excavation and grading; backhoes during utility construction; and pile drivers, concrete mixers and pumps, saws, hammers, cranes, and forklifts during building construction. Table 5.1.7 -1 presents typical noise levels for various types of construction equipment.

There are no sensitive noise receptors on the Grounds, as defined in Section 4.1.7. Unless construction would include pile driving near the property line, it is not anticipated that construction noise limits would be exceeded at the property line. Therefore, no adverse impact from construction activities on the site is anticipated.

Table 5.1.7-1
Construction Equipment Noise Levels
Before and After Mitigation (dB(A))

		Noise Level at 50 Feet	
Equipment Type		**Without Noise Control**	**With Feasible Noise Control[1]**
Earthmoving			
	Front Loaders	79	75
	Backhoes	85	75
	Dozers	80	75
	Tractors	80	75
	Scrapers	88	80
	Graders	85	75
	Truck	91	75
	Pavers	89	80
Materials Handling			
	Concrete Mixers	85	75
	Concrete Pumps	82	75
	Cranes	83	75
	Derricks	88	75
Stationary			
	Pumps	76	75
	Generators	78	75
	Compressors	81	75
Impact			
	Pile Drivers	101	95
	Jack Hammers	88	75
	Pneumatic Tools	86	80
Other			
	Saws	78	75
	Vibrators	76	75

[1] Estimated levels obtainable by selecting quieter procedures or machines and implementing noise control features requiring no major redesign or extreme cost.

Source: U.S. Environmental Protection Agency, 1971

Alternative A activities would include the movement of construction equipment and materials to the development site, the removal of demolished materials from the site, and the commuting of the construction crew to and from the site.

Noise generation from heating, ventilating and air conditioning (HVAC) equipment, vehicles, and facilities maintenance equipment such as lawnmowers is not anticipated to change from the existing noise levels these sources. Therefore, there would be no adverse noise impact.

Mitigation

Best management practices and construction procedures will be implemented during construction of Alternative A to minimize construction noise at the sources as necessary to meet District standards. Noise barriers should be used as necessary to attenuate noise from the construction site. It is recommended that construction specifications require the selection of truck routes that will minimize the potential for truck noise impact during construction.

5.2 CULTURAL RESOURCES

5.2.1 Archaeological Resources Impacts – Alternative A

Alternative A would have no effect on archaeological sites that may be potentially eligible for nomination to the National Register. None of the proposed alterations would be below the stratum of fill that sits on top of the historic circa 1878 grade. Consequently, potential archaeological sites would be located below the project area or outside of the project area bounds.

During implementation of the proposed improvements, debris relating to the Monument's previous construction and/or modification efforts could potentially be encountered. Should resources be encountered during construction, however, activities will stop while appropriate studies are conducted.

5.2.2 Historical Resource Impacts – Alternative A

The NPS has entered into a programmatic agreement with the National Capital Planning Commission, District of Columbia Historic Preservation Office (SHPO) and the Advisory Council on Historic Preservation (ACHP) for implementation of the proposed security improvements. This agreement, which is provided in the Appendix, spells out the consultation process as required by Section 106 of the National Historic Preservation Act and Advisory Council regulations (36 CFR Part 800). On February 28, 2002, the District of Columbia Historic Preservation Review Board (HPRB) formally conducted a Section 106 review of the proposed permanent security improvements to the Washington Monument and its Grounds associated with Alternative A. The HPRB voted to adopt the staff report, which recommended that the DC-SHPO continue consultation with the NPS and other parties, supported the proposed modifications to the 1993-modified DCP and supported Alternative A's concept for improvements to the Monument Grounds, including the concept of an addition to the Monument Lodge.

Structural Integrity

The proposed security improvements for the Washington Monument would include construction of a passageway that would penetrate the below-grade exterior wall of the Monument above the foundation. After visitors passed through the new screening facility, they would enter the proposed underground passageway, and proceed through the Monument foundation into the deepened elevator inside the Monument for ascent to the observation platform. The finished dimensions of the interior of the passageway would be about 10 feet wide, 8 feet high, and approximately 200-250 feet long.

In reviewing available data, engineers have concluded that the best information on the ability of the Monument to withstand the construction of the proposed access passageway lies in the recorded behavior of the Monument during the 1879 underpinning and subsequent buttress construction. The most pertinent fact about the previous work is that the original foundation was able to span about 70 square feet of excavation (7 feet by 10 feet) with a minimum of added supports. This was successfully accomplished on all four sides of the Monument during construction of center buttresses after the underpinning. The strength of the original foundation to accommodate extensive excavations into its masonry, while supporting approximately half of the total finished shaft weight, portends well for the more limited, carefully braced construction planned for the proposed passageway.

To minimize the potential for movement in the existing Monument foundation system during construction of the passageway through the foundation wall, engineers have planned a particular sequence of specific techniques for construction. Excavation of a working area to the east extent of the Monument foundation would involve the installation of a soldier-pile cofferdam (retaining wall) set into grout-filled holes drilled to the top of the Monument foundation pad. The cofferdam would be substantially reinforced and the soils excavated from inside of the cofferdam would be distributed to minimize unbalanced loading of underlying soils. A drill rig would be lowered into the area secured by the cofferdam and construction of the passageway through foundation would be completed utilizing drilling equipment and adding stressed steel support ribs, hydraulic jacks and masonry anchors to stabilize excavated areas. The heavily reinforced, four-foot-thick sidewalls of the passageway would be completed first one at a time by progressively excavating a 4-foot wide slot and installing tightly wedged ribs, followed by

casting a reinforced concrete beam in the slot. Hydraulic jacks would be used to transfer the load from the Monument above onto the beam. After both sidewalls were in place, the passageway would be excavated progressively as top and bottom braces were installed to buttress the Monument foundation against the potential for lateral and vertical movement. To further ensure the stability of the Monument, a sensitive motion monitoring system would be installed on the foundation and examined daily.

Other Historical Resources

Alternative A would also involve positive impacts due to the removal of the temporary structures that currently exist at the base of the Monument. In addition, because high quality pavers would be used to replace the asphalt, there would be a positive impact on that element.

Alternative A's proposed system of walls and berms is consistent with the approved DCP and with other historical proposals for landscape treatments of the Grounds. After the Monument's dedication in 1885, terraces and ornamental retaining walls were proposed but abandoned in favor of the simpler grassy mound landscape that exists today. Over the years, elaborate proposals for the Grounds have been suggested. While none of these proposals were fully developed, the concept of a more complete, symmetrical landscape treatment has been included in various development plans for the Grounds. Therefore, the terracing and walkway systems proposed under Alternative A would be compatible with the history of development plans for the landscape of this historic resource.

Alternative A would result in a positive impact on the historic Monument Lodge by rehabilitating and adaptively using it as the entrance portal to the underground visitor screening facility and passageway to the Monument. This would be a positive impact because it would remove the 1960's cinderblock lean-to and aluminum awning additions that detract from the historic structure. The use of the Lodge as a facility for visitors would also be a positive impact because it would give a suitably distinguished function to the historic structure. However, Alternative A's installation of the proposed stair addition on the west side could affect the physical integrity of the structure. The building addition must be installed in a manner that allows it to be reversible with minimum damage to the historic fabric of the structure.

Alternative A would retain and enhance the landscape elements and features that are contributing resources to the landscape. As presented in greater detail in Section 5.2.4, the historically important views of the cultural landscape would be maintained and enhanced. The view from the Ellipse to the Jefferson Memorial would be enhanced by the removal of the 16th Street Parking lot, the view of the greensward from West Potomac Park would not be impacted due to use of earthen berms to shield the visibility of the wall, and views from the National Mall would be unchanged. In addition, the flagpoles would be retained, the removal of the 16th Street parking lot allow completion of the German-American Friendship Garden, and regrading of the topography would create a more symmetrically shaped mound around the Monument while maintaining the informal open space setting of the Grounds.

In general, Alternative A's restrained design is sensitive to the simplicity of the Monument Grounds. Although it proposes a minor change to the landscape, the change would preserve the openness and restore some of the original design intent to the Grounds. Alternative A would situate the Monument firmly in its landscape, drawing together the obelisk, the mound, the other structures, and the open lawn areas into a total composition. Overall, Alternative A respects and enhances the landscape and setting of the Monument and Grounds.

Mitigation

- Pursuant to a Programmatic Agreement, the NPS will continue to consult with the District of Columbia Historic Preservation Office (DC-SHPO), ACHP, NCPC, and concurring parties to ensure that the undertaking will meet the Secretary of Interior's Standards for Rehabilitating Historic Structures and Cultural Landscapes.
- NPS will continue engineering analysis to ensure that excavation and construction through the foundation will be conducted without harm to the Monument's integrity.
- The additions to the Monument Lodge will be installed in a manner that allows it to be reversible with minimum damage to the historic fabric of the structure.
- Rehabilitation of the Monument Lodge will be achieved in accordance with the Secretary of the Interior's Standards.
- Ground surfaces and planting materials will be of the highest quality and appropriate to the historic precedents.

5.2.3 Cultural and Ethnographic Resource Impacts – Alternative A

The November 2001 *Program Requirements for the Washington Monument Permanent Security Improvements* cite "Preservation of Cultural Landscape Quality" as a primary objective in the design. Therefore, consideration of this factor is important in evaluating both build alternatives and the No Action Alternative.

Alternative A would facilitate and enhance many of the annual cultural events and public gatherings on the Monument Grounds. For example, Alternative A's proposed retaining walls and earthen berms would provide seating during public events and the proposed improvements would not adversely affect the ball fields, kite festival, or the 4th of July celebration. Alternative A also proposes to reconfigure the walkways to be accessible to all pedestrians. This reconfiguration would create a positive impact by making cultural gatherings and events open and accessible to more people. Furthermore, Alternative A would remove the temporary structure on the Monument's eastern side. This would create a larger plaza composed of high quality materials.

Alternative A's proposal to build an underground visitor screening facility and passageway would help preserve the cultural landscape quality of the Monument Grounds while providing necessary improvements. There would be no cumulative impacts on cultural and ethnographic resources under Alternative A.

Visual simulation viewpoints for Alternative A

5.2.4 Visual Resource Impacts – Alternative A

Methodology

This visual impact assessment addresses potential changes to views and vistas that can be attributed to the proposed action. This analysis is based in large part on computer-generated photo simulations of the improvements as proposed under Alternatives A, B, and C. These simulations represent views toward the Monument from public viewpoints in surrounding visual character areas and were selected based on the potential to maintain the integrity of the site from the selected viewpoints.

Views of the Washington Monument were photographed using a 50-millimeter lens, which most closely approximates the human eye, on a 35 mm Single Lens Reflex (SLR) camera. These photographs were then used for further analysis employing computerized visual simulation techniques. Computer-aided design drawing (CADD) models of the landscapes proposed in Alternatives A, B, and C were developed based on information provided by the project landscape architects and engineers. The computer models were developed as “wire-frame” diagrams of the building that were rectified to the existing site elevation and topography matching the site locations in the photographs. These models were then imported into a computer drawing program and overlaid on the digitally scanned photographs taken from each of the four viewpoints. The final product provides an accurate representation of the location, scale, and mass of the proposed designs superimposed on each photograph.

Impacts to views and vistas are determined based on an analysis of the existing quality of the landscape in view, the sensitivity of the view (such as important views from historic and cultural sites) and the anticipated relationship of the proposed design elements to the existing visual environment.

Visual impacts in the analysis presented below are described in the following categories:

- **No visual impact** – The proposed design would not be visible from the representative viewpoint.
- **Minor visual impact** – The proposed design would be visible as a background element of a view. It would not interfere with views from the representative viewpoint and would not change the character of the existing view.
- **Moderate visual impact** – The proposed design would be visible as part of a view that includes elements of similar mass and scale without changing the character of the existing view.
- **Major visual impact** – The proposed design would be visible as a contrasting or dominant element that interferes with views from the representative viewpoint and substantially changes the character of the existing view.
- **Positive visual impact** – The proposed design improves a view or the visual appearance of an area.

Visual Impact on the Grounds

Alternative A proposes the construction of an underground access and screening facility. With this addition, visitor services and queuing would occur out of sight, allowing the Grounds to maintain a more dignified appearance. Walled terraces and pathways would be installed to provide an access control and barrier system. Intended to have little impact on the visual appearance of the Grounds, these structural alterations would allow the gentle slope of the landscape, or grassy mound, to appear smooth and rolling from a distance. As demonstrated by the simulations, however, the proposed walled terraces would have a minor effect on the appearance of the Grounds, especially as one moved closer to the Monument. Overall, as a below-grade option, Alternative A would restore and improve the visual integrity of the Grounds and have a positive impact on visual resources.

Visual Impact on the Plaza

Under Alternative A, the Monument plaza would be improved by the removal of the interior screening building. The visual quality of the plaza would be greatly altered in this instance, but

the impact would be very positive. In addition, the existing plaza pavement would be replaced with higher quality materials in a design that would be sympathetic to the 1888 plaza. As a result, a visitor would be presented with the order and balance of a repetitive paving pattern. The eye would move quickly away from the familiar pattern below to the contrasting simplicity of the Monument above, and then on to the views and vistas of the Monumental Core from the plaza. Overall, the impact of Alternative A on the plaza would be positive.

Visual Impact on Views and Vistas

To preserve the existing views and vistas of the Washington Monument and the Monumental Core, an underground access and screening facility is proposed to be below-grade in Alternative A, as mentioned above. Rather than having bollards or concrete jersey barriers, a series of low walls and terraces would gracefully surround the Monument for protection. Thus, from the top of the grassy mound, vistas outward would be maintained. With the visitor screening facility underground and protective barriers out of sight, the vistas to and from the Monument would not be obstructed by intrusive elements that detract from the viewshed. Overall, Alternative A carefully considers and sensitively addresses the issue of views and vistas to and from the Washington Monument, and the impact would be positive.

Simulation #1 – View from 14th Street and Independence Avenue looking northwest toward the Washington Monument Grounds. The simulation illustrates the regraded mound and a low retaining wall surrounding the Washington Monument. In addition, the concrete jersey barriers have been removed. The simulation does not include the trees that would be added under the landscaping plan.

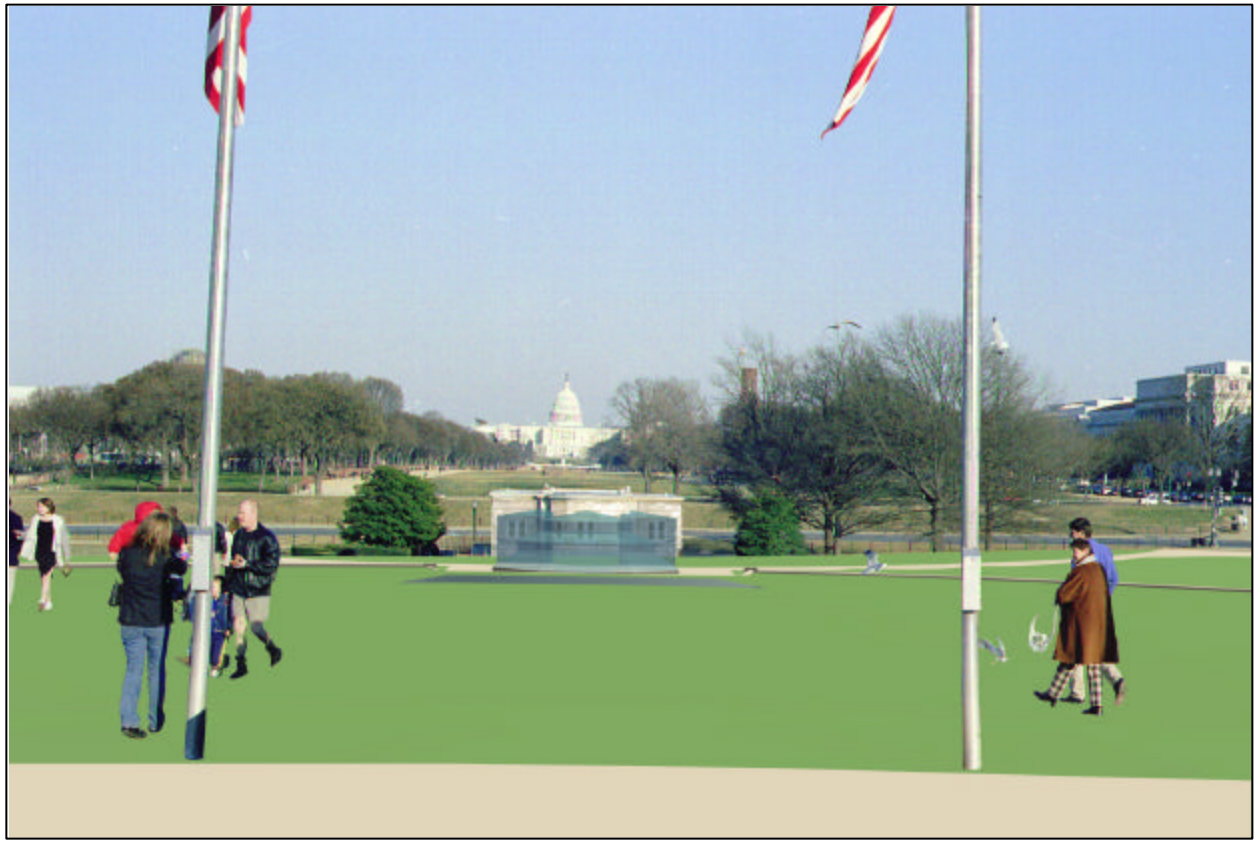
Simulation #2 – View from 17th Street and Independence Avenue looking northeast towards the Washington Monument. The simulation shows the proposed terraces at the junction of two pathways, and illustrates the continued open character of the Grounds.

Simulation #3 – View from West Potomac Park at 17th Street looking east towards the Washington Monument. The simulation illustrates how the open area to the west of the Monument would be regraded to shield views of the terraces. The simulation also includes the removal of the concrete jersey barriers.

Simulation #4 – View from Constitution Avenue near the 16th Street parking lot looking southeast towards the Washington Monument. The simulation illustrates the removal of the parking lot and completion of the German-American Friendship Garden.

Simulation #5 – View from Milepost 0 Marker on north side of the Ellipse looking south towards the Washington Monument and the Jefferson Memorial. The simulation illustrates the continued open character of the Grounds and the preservation of the north-south vista to the Jefferson Memorial.

Simulation #6 – View from corner of 15th Street and Constitution Avenue looking southwest towards the Washington Monument. The simulation illustrates the regraded mound surrounding the Washington Monument, including the low retaining wall and the removal of the concrete jersey barriers.



Simulation #7 – View from the Washington Monument looking east towards the U.S. Capitol Building and the National Mall. The simulation illustrates the regrading of the landscape, the removal of the concrete jersey barriers, the removal of the additions by the Monument Lodge, and the relocation of the flood light bays from the foreground of the view.

Simulation #8 – View from the National Mall looking west towards the Washington Monument. This simulation illustrates the enhanced east-west axial view from the National Mall. It also shows the regrading of the landscape and the removal of the concrete jersey barriers.

5.3 VISITOR USE AND EXPERIENCE

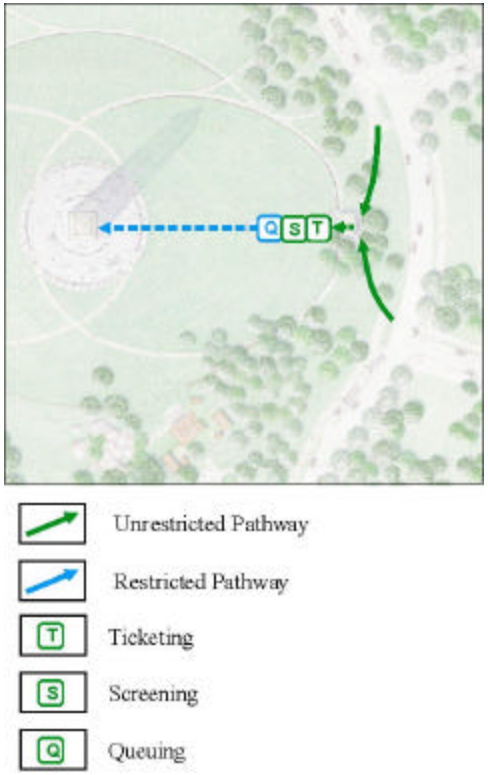
The purpose of this impact analysis is to determine if proposed security improvements at the Washington Monument are compatible with the desired visitor experience goals at the Monument and surrounding monuments and memorials. To determine visitor experience goals, the two visitor surveys from 1998 (University of Idaho and West Virginia University) and National Capital Parks-Central staff observations concerning visitor attitudes and satisfaction regarding existing visitor experience, interpretation, and educational opportunities at the Monument and surrounding memorials were evaluated. The impacts to visitor use and experience associated with proposed security changes were determined by evaluating the changes against what visitors currently experience while planning for and visiting the Washington Monument.

Certain assumptions were made in conducting the impact analysis. Because the visitor facilities proposed in this alternative are conceptual, it was assumed that the facility would accommodate the number of visitors acquiring Washington Monument tour tickets each morning, that the screening and queuing facilities would be similarly sufficient in size, and that elevator or stairway access into the facility would accommodate the anticipated visitor load. To identify the intensity of visitor use impacts, the following impact thresholds were defined:

Negligible*:* Little noticeable change in visitor experience or in the defined indicators of visitor satisfaction or behavior.
Minor: Desired visitor experience is changed, but without appreciably limiting or enhancing critical characteristics of the experience. Visitor satisfaction would remain stable.
Moderate: Critical characteristics of the desired experience are changed or the number of participants engaging in an activity is altered. Visitor satisfaction would begin to decline.
Major: Security changes would contribute substantially to the elimination of or detraction from the desired visitor experience of the Washington Monument. Visitor uses and/or visitor satisfaction would decline substantially over the long term.
Positive: Improvements would contribute to the enhancement of the visitor experience, either by the removing of structured elements that currently detract from the visitor experience, or by introducing new features of amenities.

5.3.1 Visitation Patterns Impacts – Alternative A

Visitation to the Washington Monument cannot increase beyond current levels because of the existing elevator capacity. The new visitor screening facility is designed to accommodate the current number of visitors that do not obtain their timed tickets before coming to the Washington Monument. It is expected that the percentage of visitors obtaining tickets through an advanced reservation system, including via the internet, will continue to increase.



Alternative A Site Access Diagram

In the long term, the physical capacity restrictions of the Washington Monument itself would continue to limit the number of visitors that would experience the interior of the Monument and the view from the Monument's observation level. Because the capacity of the Monument elevator and the available space on the observation level at the Monument are limited, a new visitor screening facility itself would not increase the number of visitors that tour the Monument. However, the facility would provide educational and interpretative exhibits and a unique view of the Monument from below ground. It could accommodate visitors who do not intend to ascend the Monument, or who are unable to acquire a tour ticket.

5.3.2 Visitor Experience Impacts – Alternative A

Access and Orientation

The new underground screening facility would visually improve the approach to the Monument by removing detracting elements. It would not affect the ability of visitors to walk up to the exterior of the Monument and physically touch the structure. It would, however, alter how visitors access the interior of the Washington Monument. The relocation of above-grade functions that are currently visible, such as ticketing or queuing, into an underground facility could result in some temporary minor disorientation as visitors adapt to the location of the new facility. However, the central and visually prominent location of the Monument Lodge on the east-west axis of the National Mall, the presence of signs and NPS personnel on the surface to direct visitors to the new underground facility and provide site information, would mitigate potential visitor confusion. In the long run, the Monument Lodge would serve as an identifiable focal point for all Monument services. As noted in both visitor studies conducted in 1998, personal contact with NPS staff is preferred by visitors and improves their experience.

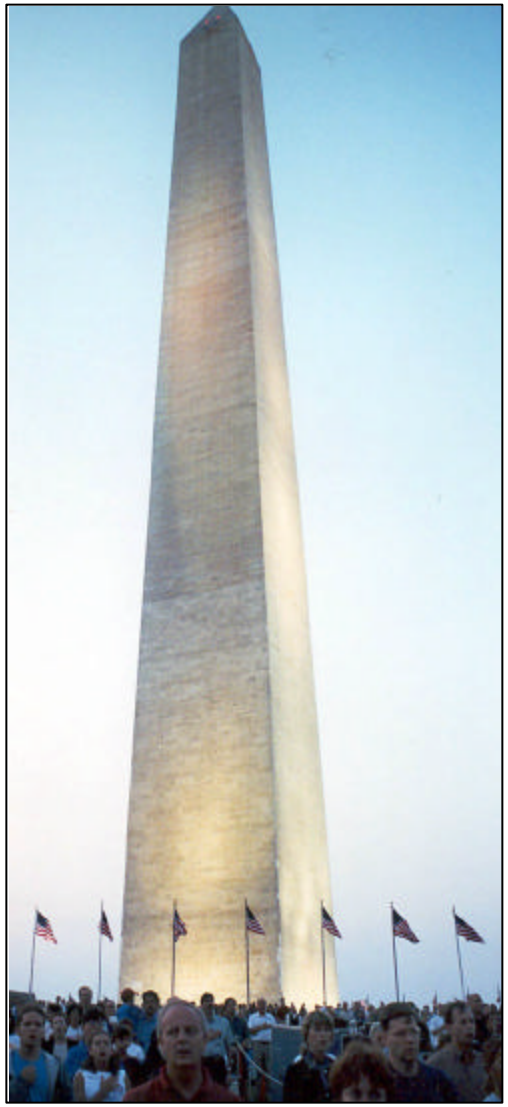
The elliptical paths leading to the Washington Monument would meet accessibility standards for disabled visitors; this would provide a moderate positive impact. The gradual rise in elevation along the path to the Monument would be easier to negotiate than current paths. However, the circular nature of the paths would not always provide the most direct paved route to the Washington Monument for visitors when they arrive on the Monument Grounds; this would result in a minor adverse impact for some visitors, although the visitors would still be permitted to walk across the grass to the Monument.

Because tours would be organized and managed from the underground screening facility, official vehicles such as trash trucks and security personnel vehicles would not be parked on the Monument Grounds except in an emergency or during maintenance activities. The removal of these vehicles and the concrete jersey barriers from the area surrounding the Monument Plaza would provide a positive impact to visitors as they approached the Monument because of the improved view and improved pedestrian circulation that would result.

Washington Monument Tour

The addition of an underground visitor screening facility would not change the essential components of ascending the Monument, but it would alter how the visitor prepares for the tour. Specifically, the proposed addition would relocate the ticketing, security screening, and tour queuing areas, and would provide them in improved facilities.

The process of acquiring a ticket for ascending the Monument would remain the same. Visitors could continue to acquire their tickets in advance via the reservation system or acquire their ticket on a first-come, first-served basis the morning of their desired tour date. On-site ticketing would be available in the underground screening facility. Visitors would enter the Monument Lodge and take stairs or an elevator to the ticketing area of the underground facility. The facility would be as visible to visitors as the current ticket kiosk; and it would be located directly on the central east-west axis of the Mall, thus providing an architectural cue signaling the location of the entrance. It would also provide protection from inclement weather. Overall, impacts to visitors during the ticketing process would be negligible and visitor comfort would substantially improve, particularly if signs and NPS staff were available to educate visitors about the new facility and the ticketing process.



Once ticketed, visitors could leave and return to the facility just prior to their tour time if they had other attractions to visit or they could proceed to the screening area. After being individually screened, using x-ray machines and magnetometers, visitors would be free to enjoy the educational and interpretive exhibit area, the bookstore, or use the restrooms. The new exhibits would provide visitors with the opportunity to learn more about George Washington, the city of Washington, DC, and the history of the Monument. For visitors unable to acquire a ticket to ascend the Monument, the exhibits would display information that is currently only available on the interior of the Monument. These new opportunities would be a positive improvement to a visitor's experience.

Approximately 30 minutes prior to a visitor's designated tour time, the visitors would begin queing to enter the Monument itself. Groups of 20 to 25 visitors would be ushered into a small staging area where a Ranger would provide information and stories that would prepare the visitors for their tour. From this area, visitors would be led through an underground passageway to the elevator in the lower level of the Washington Monument.

Relocation of the tour queuing and visitor screening, as well as access to the Monument into the proposed underground facility would slightly alter a visitor's experience of the Monument. Whether this change is beneficial or adverse depends upon each visitor's perceptions or desired experience, but would most likely result in a moderately beneficial change in individual visitor experience. Visitors intending to ascend the Monument would no longer be required to wait on the Monument plaza while waiting in lines for tours. For persons who value viewing the context of the Monument, waiting underground could be an adverse impact. However, for all visitors to the Monument Grounds, their trip to the Monument would be significantly enhanced due to the removal of the concrete jersey barriers and the interim screening facility on the plaza. In addition, visitors would be protected from the heat and humidity in the summer and inclement weather throughout the year as they wait in the underground facility, and the opportunity for additional education and interpretation prior to entering the Monument would provide further benefits.

Accessing the Monument underground would also be viewed with a range of emotion or perception. Because most tour visitors are anxious to experience the view from the top of the Monument, view the commemorative stones, and learn about the Monument, accessing the

Monument from underground would not alter that intrinsic experience. Additionally, visitors would continue to have the opportunity to exit the Monument at grade, walk around the base of the Monument and the paths, and view the Monument in the context of the National Mall. Although underground facilities would change the experience, overall adverse impacts to the visitor experience from the underground screening facility and passageway would be minor.

Once visitors entered the Washington Monument, the tour of the Monument would be conducted as it is today. The ascent to the top would take approximately 70 seconds. Visitors would have the opportunity to view Washington from the windows in the observation level and to view the exhibits on the floor below. They would take the elevator back down, viewing the commemorative stones on the way, to the first floor of the Monument (at grade).

They would not be allowed to return to the underground passageway and visitor screening facility via the elevator, but would exit the east side of the Monument onto the Monument plaza. They would experience an improved axial vista of the U.S. Capitol. Strollers left behind in a non-secured area of the visitor screening facility would have to be retrieved by returning to the visitor facility via the paths circling the Monument. This circular return would result in minor negative impacts to visitors who must leave behind items during security screening.

5.3.3 Resource Interpretation Impacts – Alternative A

The features most often enjoyed by Monument visitors would not be affected by the underground screening facility. Visitors with tour tickets would still be able to view Washington, DC from the top of the Washington Monument and they would continue to view the restored commemorative stones on the interior of the Monument as they descend from the Monument's top floor.

The screening facility would provide new educational and interpretive exhibit and program space that would greatly enhance the existing visitor experience. One of the greatest limitations within the Washington Monument from a visitor experience perspective has been the limited time and physical space available for quality education and interpretation programs. The 70 seconds during the ascent to the Monument top and the several minutes on the return trip do not provide ample time to present much information to help visitors understand and connect with the Washington Monument. With the addition of new educational and interpretive space, tour

visitors would have the opportunity to learn about George Washington's life and contributions to the country, the Monument's history, and the role of the Monument in the landscape of the Federal City while waiting for their tours. Educational and interpretive exhibits in the ticketing area and lobby, as well as the underground view of the Monument, would also provide added benefits for those visitors unable to acquire a tour ticket and would provide a replacement experience during times when the Monument closes for maintenance or other needs. These additional educational and interpretive functions would substantially improve the visitor experience.

Cumulative Impacts

Existing tours and educational and interpretive opportunities would continue to be available at museums, memorials, and other NPS sites in the vicinity of the Washington Monument. These opportunities would continue to enhance the experience of visitors to Washington by providing additional information on the historic city and the Nation's most important commemorative resources. The enhanced visitor experience at the Washington Monument, in combination with other tour experiences, would increase visitor knowledge about the history of the nation and the important figures in creating that history.

Overall, the underground screening facility and the landscape security improvements associated with Alternative A would enhance the visitor experience at the Washington Monument and its Grounds. The number of visitors able to tour the Washington Monument itself would continue to be limited by the capacity of the elevator ascending to the observation level. The intrinsic qualities of the tour would remain the same. All visitors would continue to have access throughout the Grounds and to the base of the Monument via proposed pathways or across the grassy landscape. Relocation of major components of the tour process, such as tour queuing and security screening, could alter the visitor experience depending upon individual perspective and needs. However, the potential adverse impacts such as the underground access to the Monument would be mitigated by the added benefits of new facilities, protection from the elements, added interpretive functions, and improved visual experience. Overall, Alternative A would result in a major improvement to the visitor experience for a large number of visitors.

5.4 SOCIO-ECONOMIC ENVIRONMENT

5.4.1 Land Use Impacts – Alternative A

As the largest open space in the heart of the Nation's Capital, the Washington Monument Grounds are an important recreational and natural resource for the city. Therefore, it is important that the alternatives respect and enhance the existing land uses of the site.

Under Alternative A, the Monument Grounds would retain their general land use and context as an open space used for ceremonial, recreational, educational, and cultural functions. Activities on the Monument Grounds would continue to be conducted pursuant to NPS permitting procedures and requirements. In addition, the Survey Lodge and the Sylvan Theatre would be retained for their original administrative and cultural land uses. However, the Alternative A proposes to adaptively use the Monument Lodge, remove an existing unsympathetic addition, and add an extension to its western side. In addition, this alternative would remove the 16th Street parking lot to the north of the Monument. This removal would create a positive impact by allowing the German-American Friendship Garden to be completed consistent with its original design intent and use. Overall, Alternative A would have a positive impact on the current land use of the site and the study area.

Plans and Policies

Alternative A would be consistent with the *Comprehensive Plan for the National Capital, Federal Elements* (1977-1984, updated 1990). With respect to the *Parks, Open Space and Natural Features* element and the *Preservation and Historic Features* element, Alternative A would comply with the following policies:

- The integrity of the Monumental Core as a setting to enhance public buildings and monuments would be retained. Additionally, the landscape would continue to serve as an outdoor area for cultural and recreational activities.
- The proposed new construction would be compatible with the historic architectural character and cultural heritage of the historic structure in its design, height, proportion, mass, configuration, building materials, texture, color, and location, particularly in the immediate vicinity of the Monument.

- A landscape solution need for a vehicle barrier system would protect and enhance the distinguishing qualities and character of the Historic Landscape.
- Adaptive reuse the Monument Lodge for a visitor facility would provide for the continued, appropriate use of the Historic Property.

Alternative A also would not affect NPS regulations about sales, concessions, and permitting.

5.4.2 Recreation Impacts – Alternative A

Alternative A proposes a vehicle barrier system of walled terraces and berms. During re-grading of the Grounds, some passive or casual recreational activities near the Monument would be temporarily disrupted. However, the majority of active recreation uses, such as ball playing, occur on the outer areas of the Grounds. Therefore, the terrace system would not have an adverse long-term effect on recreational activities. Although the walls and berms would partially alter access across portions of the site, the current use of the Grounds for recreation would not be affected by Alternative A.

The reconfigured walkways and the removal of existing concrete jersey barriers would have a positive impact on the recreational patterns of walkers and joggers who currently use the walkways. The reconfigured walkways would be accessible to all pedestrians, thereby extending recreational opportunities to more people, and would benefit walkers and joggers who prefer paths with long, gradual curves instead of steep slopes.

5.4.3 Socio-Economic Resource Impacts – Alternative A

Socio-economic resources, including population and economic conditions, are generally affected by a proposed action when there are residential or commercial/retail uses on or in the immediate vicinity of the site. Since there is no housing located within or adjacent to the study area, there would not be any measurable impacts to housing, community services, social conditions, or population. Likewise, since there is no commercial/retail space within or adjacent to the study area, there would be no measurable impacts to economic resources.

5.4.4 Infrastructure Impacts – Alternative A

The development of Alternative A would result in minor impacts to infrastructure at the Monument Grounds. More specifically, the project would result in positive impacts to pedestrian infrastructure at the Grounds and minimal impacts to parking, as discussed regarding the impacts of Alternative A on transportation. The stormwater infrastructure at the Grounds would not be substantially affected by development of the project, as discussed regarding the impacts of Alternative A on water resources. Other utility infrastructure at the Grounds would also not be substantially affected by development of Alternative A. As discussed regarding the impacts of Alternative A on visitor use and experience, development of the Alternative A would not result in increased visitation to the Monument. Therefore, demand upon the electric, gas, water, and sanitary sewer lines at the Grounds would not increase due to Alternative A. In fact, relative to a above ground facility, the location of the screening facility underground would improve the efficiency of the utility systems. Design and configuration of the utility lines at the Grounds in response to the orientation of new facilities in Alternative A would be the responsibility of the utility service providers.

5.4.5 Transportation Impacts – Alternative A

Walkways

The Grounds walkways would be modified in accordance with the proposed grading, landscape, and vehicle barrier system. The system of elliptical-shaped pathways and associated terraces would guide pedestrian movement across the Monument Grounds. In addition, the walkways would improve accessibility in terms of reducing existing steep slopes, thereby, creating a positive impact for access by visitors with disabilities.

Parking

Alternative A would eliminate the parking lot located on the north side of the Grounds, accessed by Constitution Avenue. The lot provides 108 parking spaces; however, these spaces are not only dedicated to visitors of the Monument and its Grounds. This parking lot, as with other parking areas on or near the Mall, are part of a parking plan that allows visitors to access several monuments from one of the parking areas without moving their vehicle. Accommodating access to the Monumental Core of the Nation's Capital is part of an ongoing NPS transportation study, investigating alternatives for a vehicular transportation system.